THE AMERICAN REVIEW OF TUBERCULOSIS

OFFICIAL JOURNAL OF THE AMERICAN TRUDEAU SOCIETY

ABSTRACTS

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VOLUME LIV

JULY-DECEMBER, 1946

PUBLISHED MONTHLY

AT MOUNT ROYAL AND GUILFORD AVENUES, BALTIMORE 2, MD.
BY THE NATIONAL TUBERCULOSIS ASSOCIATION

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VOLUME LIV JULY, 1946 ABST. No. 1

Treatment of Tuberculous Cavities.—The biological and physical factors in the genesis of cavities are discussed. The therapeutic approach differs in that the patient with cavities of biological pathogenesis (caseous destruction) should receive total treatment for tuberculosis—both as a generalized disease and as a local affection. In the cavity of physical or mechanical genesis (distensible, nonretractible) the local aspect is the principal one to be solved, and earns the designation of a separate disease. The best approach to the handling of the cavity is to set down a basic treatment for all cavitary lesions and determine later with precision the subsidiary or substitutive procedures applicable within the anatomical-clinical indications. Cavities are classified essentially into soft or hard walled ones as recognized radiographically. Also considered are manifestations of insufflation of the cavity, patency of draining bronchi and intracavitary tension. Treatment is classified into 5 groups: direct pneumonolytic intervention (open, closed, subfascial, extrafascial, and intramural pneumonolysis), functional intervention (phrenic and other nerve- and muscle-operations), plastic operations, direct treatment of the cavity (open drainage, sclerosing, antiseptic, or filling substances, Monaldi type drainage, intracavitary cauterization, ligature of draining bronchus, internal plugging of the draining bronchus), and excisional surgery. The routine study of the patient recommended includes gas analysis and manometry of intracavitary gas, cavernoscopy to study the internal surface of the cavity and the opening of the draining bronchus, the coexistence of bronchial tuberculosis, and the mental, socio-economic and environmental factors. The basic routine for all cavitary cases is three-fold: hygienic-dietetic (rest, position, diet), pneumothorax and whatever medicinal or climatic therapy may be applicable. Other procedures are considered subsidiary or as substitutes and are considered when intrapleural pneumothorax has failed. Some of them are as follows: Operable adhesions should be attacked in the second or third month of pneumothorax. Thoracoscopy should be done in cases of uncollapsed lower lobe cavities even though no adhesions are seen, as they are often invisible radiographically. For the inoperable types of apico-costal adhesions, extrapleural pneumonolysis is recommended. The handling of other inoperable adhesions depends on the type and location of the cavity. An extrapleural pneumothorax is recommended in the apical soft walled cavity. If the lesions extend to the base of the upper lobe or lower, a mixed pneumothorax is done, extrapleural above and intrapleural below with either independent pockets or preferably communicating ones. The hard walled upper lobe cavity is handled by a partial thoracoplasty. For the bilateral case combinations of intra- and extrapleural pneumothorax, sometimes with phrenic nerve operations are considered. In general when the extent of disease in a bilateral case contraindicates bilateral pneumothorax, it also contraindicates use of any of the subsidiary or substitutive measures. Bilateral thoracoplasty is not favored. Considerable space is given to a consideration of cases where pneumothorax is ineffective despite the absence of adhesions. Such cases are due to elastic atony or retractile inertia of the lesion, or to bronchial obstruc-

tion. Bronchoscopy with treatment of bronchial lesions is indicated unless the cavity is peripheral when thoracoplasty should be done. Otherwise pneumothorax may be continued. When pneumothorax is impossible because of pleural symphysis, extrapleural pneumothorax should be done for recent upper lobe cavities and thoracoplasty for old ones, phrenic nerve interruption for lower lobe cavities. For ipsolateral resistant bronchial lesions in this group, thoracoplasty is recommended. When an extrapleural pneumothorax is not effective because of extent of disease, phrenic interruption might help as an adjunct although the choice would be to abandon the pneumothorax and do a thoracoplasty. Subsidiary and substitutive procedures to phrenic paralysis are listed as: bed-rest (lateral position), pneumoperitoneum, extrapleural pneumothorax, thoracoplasty, transparietal aspiration or lobectomy. In thoracoplasty failures, the following are recommended: revision with or without ligature of lung stump, phrenic interruption, transparietal aspiration, open drainage, lobectomy or pneumonectomy. Excisional surgery is termed radical. Prompt and adequate treatment is stressed in any type of lesion.—*Sistematica del tratamiento de la caverna tuberculosa del pulmon, R. F. Vaccarezza & O. A. Vaccarezza, Prensa méd. argent., May, 1945, 32: 785.*—(*J. S. Peterson*)

Treatment of Tension Cavity.—Institution of a pneumothorax in a patient with cavitary pulmonary tuberculosis and subsequent pneumonolysis caused the cavity to increase in size and to assume the characteristics of a tension cavity. Five-tenths mg. of atropine sulfate was injected intravenously daily and small refills were given more frequently. After two weeks of such treatment the cavity disappeared. It is assumed that the beneficial effect in this case was due to the relaxation of the bronchial tree and the subsequently improved bronchial drainage of the ballooned cavity.—*Actions des injections endoveineuses d'atropine et des insufflations pleurales rapprochées sur une caverne ballonnisée, M. Bariéty, R. Lesobre & P. Choubrac, Rev. de la tuberc., 1943, No. 4/6, 8: 75.*—(*G. Simmons*)

Horner's Syndrome following Pneumonolysis.—Horner's syndrome appearing after successful intrapleural pneumonolysis was observed in 4 cases. Nervous fibres from the cilio-spinal centre pass into the anterior branches of the first three dorsal nerves, reach the stellate ganglion and finally the cervical sympathetic structures. Vieussen's nerve unites the middle and the inferior cervical ganglions or the inferior cervical and the first thoracic ganglions. Fibres innervating the iris pass through this nerve. During a high intrapleural pneumonolysis the stellate ganglion, Vieussen's nerve or communicating branches may be injured. When the stellate ganglion is injured, there may be vasomotor disturbances in the corresponding upper extremity. In all cases symptoms (ptosis, myosis and vasodilatation on the involved half of the face) subsided within a few weeks.—*Le syndrome de Claude Bernard-Horner consécutif a l'opération de Jacobaeus, Ch. Hanrich, Y. Bouwrain & G. Roche, Rev. de la tuberc., 1943, No. 4/6, 8: 56.*—(*G. Simmons*)

Mobility of Cavities during Cough.—Two hundred and eighty-two patients were studied regarding cavitary mobility during cough on fluoroscopy. (Sign of Brissaud). In the assumption that the mobility of a lesion during cough depends on the presence of a free pleural space, the value of the sign was verified in patients before and after attempt of pneumothorax. If there is complete mobility, the movements of a cavity during cough are opposite to the movements of the ribs in all positions of the patient behind the fluoroscopic screen. Cavities were classified in three categories: (*1*) cavities remaining immobile during cough in all fluoroscopic positions, (*2*) cavities with partial mobility showing the sign of Brissaud in one or the other position, (*3*) mobile cavities, showing motion in all positions. In 151 cases with immobile cavities subsequent pneumothorax was ineffective in 95 per cent of cases. In 56 cases with partially mobile cavi-

ties pneumothorax was ineffective or impossible in 50 per cent, effective in 50 per cent. In 75 cases with mobile cavities pneumothorax was effective in 90 per cent, ineffective or impossible in 10 per cent. It seems therefore that in the presence of total or absent mobility rather definite conclusions can be drawn as to the possibility of pneumothorax, whereas partial mobility gives no sure indications. The value of pneumothorax in these cases will depend on the feasibility of a pneumonolysis. Comparison of cavitary mobility before and after pneumothorax reveals that a small number of previously immobile cavities became partially or completely mobile after institution of pneumothorax. Using cavitary mobility as an indication for the possibility of a pneumonolysis the following correlations were found: in 78 cases of immobile cavities pneumonolysis was impossible in 89 per cent. An effective partial pneumonolysis could be performed only in 7 per cent. In 55 cases with mobile cavities pneumonolysis was not necessary in 51 per cent. Complete pneumonolysis could be performed in 16 per cent, partial pneumonolysis in 27 per cent. In this group, 83 per cent of pneumothoraces were effective. The sign of Brissaud, indicating the condition of the pleural space, can be of practical help in various situations. A freely moving cavity may suggest to reattempt pneumothorax in spite of several previous failures. In case of a giant cavity with good mobility the risk of pneumothorax will be more easily accepted, whereas with doubtful or absent mobility thoracoplasty will be preferred. If cavitary lesions develop on the contralateral side of a pneumothorax, cavitary mobility will help to decide on a delay before institution of the second pneumothorax. This delay should not be prolonged, if one observes diminution of cavitary mobility, indicating formation of adhesions. In cases with bilateral involvement for which bilateral pneumothorax is considered, it is advised to attempt pneumothorax on the side where more adhesions can be expected according to the sign of Brissaud. If pneumonolysis is impossible on this side, it will be useless to induce the second pneumothorax. Cavitary mobility after institution of pneumothorax gives indications about presence, form and type of adhesions as well as the possibility and usefulness of pneumonolysis.—*Quels renseignements peut-on tirer avant et après la création du pneumothorax artificiel de la mobilité cavitaire a la toux? P. Langeard, Rev. de la tuberc., July–October, 1941, 6: 435.*—(*V. Leites*)

Paralysis of Diaphragm during Pneumothorax.—The concept of the diaphragm as an organ of respiration is inadequate. Lemon demonstrated the fact that intercostal action could adequately compensate for bilateral diaphragmatic paralysis in dogs. In humans only a slight temporary lowering of the vital capacity is noted after unilateral phrenic paralysis. Lemon believes that an important diaphragmatic function is to aid in the maintenance of the intraperitoneal pressure and to transmit this pressure to the abdominal organs wherever and whenever necessary. Digestive disturbances follow not only left phrenic paralysis, but also left pneumothorax. The author noted a measurable decrease in bilateral diaphragmatic excursions following each pneumothorax refill. The decrease was more notable on the collapsed than on the uncollapsed side. Therefore, the mobility of the diaphragm depends, not only on its own contractile power and an intact phrenic nerve, but also on the level of intrathoracic pressure. Patients with left pneumothorax may have anorexia or a sense of fulness after having eaten but a small amount. The supposition is that a depressed, immobile diaphragm serves to limit the adaptability of the stomach to increasing contents. Three case histories are presented which emphasize the syndrome of anorexia accompanied by loss of weight and strength unrelated to active disease, but occasionally observed in left pneumothorax. Mechanical paralysis of the diaphragm may be especially important during the period of rehabilitation when nutritional demands are increased.—*Mechanical Paralysis of the Left Hemidiaphragm Complicating Collapse Therapy in Pulmonary Tuberculosis, O. Feinsilver, Dis. of*

Chest, March-April, 1945, 11: 138.—(K. R. Boucot)

Air Embolism in Pneumothorax.—Six instances of air embolism occurring among 950 patients receiving pneumothorax in the Municipal Institute of Tuberculosis in Buenos Aires are reported. One accident occurred during the initial pneumothorax treatment, one during the third, and the others later. The severity of symptoms varied. One patient died with a spastic monoplegia fifteen days after the accident with symptoms of a bronchogenic spread. Another patient died within two months, embolic signs having lasted four days. At the moment of the accident all patients had similar symptoms: pallor, sweating, rapid, thready pulse, loss of consciousness, etc. Twenty-four hours later symptoms were most varied. Neurological signs were contralateral to the side of the pleural puncture. Two patients had monoplegias lasting about two weeks. In all patients, there was an interval of two to five minutes between the moment of pleural puncture and the appearance of the first symptom. Evidently the nervous reflexes arise not from the pleura but from the central nervous system. The accident frequently occurs in patients whose pulmonary lesions are complicated by numerous adhesions which prevent an adequate collapse. After reviewing the experimental work of the Frenchmen, Villaret and Cachera (1937, 1938), and the Brazilians, Amorín and Branco, on air embolism in dogs and rabbits, the authors conclude that air emboli and not pleural shock account for the great majority of accidents during therapeutic pneumothorax. They state that air must be introduced into a pulmonary vein to produce the cerebral emboli which cause focal organic lesions and a series of symptoms. By way of prophylaxis, difficult or ineffective pneumothoraces should be abandoned. When an accident occurs, cardiac stimulants such as camphor or ergotamin tartrate are advised. Adrenalin should never be used.—*Nuestra experiencia sobre los accidentes nerviosos del neumotorax artificial, I. M. Hernandez & I. Smirnoff, Arch. argent. de tisiol., October-December, 1944, 20: 419.—(R. Kegel)*

Extrapleural Pneumothorax.—Reviewing end-results in 115 patients in whom an extrapleural pneumothorax had been established, the following conclusions are arrived at: (*1*) In 5 cases of early tuberculosis the results obtained were good. (*2*) Among the 35 cases of old stabilized lesions, good results were obtained in 24 (69 per cent); there were 4 deaths and in 7 the results were unsatisfactory. (*3*) In 68 cases no other collapse therapy could have been instituted. In 36 cases of this group (53 per cent) the results obtained were good.—*Résultats de 115 cas de pneumothorax extra-pleural, A. Maurer & J. Chenebault, Rev. de la tuberc., 1941, No. 5/6, 6: 370.—(G. Simmons)*

Extrapleural Pneumothorax.—Thirteen cases of extrapleural pneumothorax, established during the period 1937–1939, are analyzed. In 5 cases the lesions were recent but progressive, in 2 recent and stabilized and in 6 the lesions were cavitary and old. In 3 cases large cavities were present. Complications encountered were: (*1*) Extrapleural hemorrhages and infection: 2 cases. (*2*) Secondary infection of the extrapleural space: 3 cases. Four patients thus treated have been considered cured for three years. In one patient the pneumothorax is being abandoned. In 4 others it is being maintained with good results and in 4 an oleothorax has been substituted. In all cases the results obtained are called "perfect." Reëxpansion of an extrapleural pneumothorax always occurs from below upward and from the front toward the back. Extrapleural effusions become localized in the superposterior portion of the chest and cause considerable thickening of the pleura, which interfers with the reëxpansion of the lung and may result in retraction of the ribs and of the mediastinum. In uncomplicated cases and in those in which no conversion into an oleothorax had become necessary, thickening of the pleura and thoracic retraction are insignificant. Contralateral spread was observed in

only one case. The advantage of extrapleural pneumothorax over thoracoplasty is stressed with the assumption that after reëxpansion of the lung there is "complete functional recovery of the lung, identical to that obtained with an intrapleural pneumothorax."—*Resultats éloignes du pneumothorax extra-pleural. (13 observations de malades opérés depuis plus de quatre ans.), Ch. Gernez-Rieux, P. Razemon & R. Garcenot, Rev. de la tuberc., 1943, No. 7/9, 8: 127.*—(*G. Simmons*)

Histology of Extrapleural Pneumothorax.—The original extrapleural cavity is a wound space. Its walls undergo gradual histological changes to adapt the space to the function which it is to perform. Biopsy specimens taken at operations months and years after the original operation show that macroscopically the wall is smooth and glistening and indistinguishable from true pleura. Microscopically layers of collagenous and elastic fibres are discernible, and in 10 out of 15 cases a mesothelial covering was present. This consisted of flat or cuboidal cells, from one to several layers deep. These cells look like epithelial cells. It is likely that these layers originate from undifferentiated cells of mesenchymal origin which are found in connective tissue. In some cases the mesothelial lining was absent and the surface was formed by layers of connective tissue fibres.—*Histologische Untersuchungen der Wand des extrapleuralen Pneumothorax, R. Fink, Schweiz. med. Wchnschr., September 30, 1944, 74: 1029.*—(*H. Marcus*)

Spontaneous Extrapleural Pneumothorax.—The case of a 28 year old female is reported who subsequent to an intrapleural pneumonolysis developed an empyema which was treated with repeated aspirations. She developed a tumor-like formation of the breast which proved to be a small extrapleural pocket containing air under positive pressure (+35) much higher than the intrapleural pressure (+5). Subsequently a cold abscess developed from this extrapleural pocket and became localized within the parenchyma of the right mammary gland.—*Un cas d'empyème tuberculeux d'origine pleurale ayant provoqué la formation d'une poche aérienne extrapleurale puis celle d'une collection purulente intramammaire secondairement fistulisée, A. Clermont, Rev. de la tuberc., 1941, No. 5/6, 6: 364.*—(*G. Simmons*)

Brain Abscesses following Monaldi Drainage.—This complication of Monaldi drainage has not been reported heretofore, but it has been observed twice by the author. In the cases under consideration, the cavities had decreased markedly in size following suction drainage, but the bronchi remained open. In one case the catheter was removed and an attempt was made to replace it. This was followed by slight bleeding. In the other case the catheter became blocked and it was attempted to reëstablish drainage by flushing it. This was also followed by slight bleeding. Within a short time of this occurrence symptoms of brain abscess were noted, and death occurred within due time. On theoretical grounds alone, abscess should occur from time to time, just as it does in bronchiectasis. Trauma and bleeding must be avoided in manipulation of the catheter, as the capillary network around the cavity is extremely rich and is practically in communication with the cavity.—*Hirnabszesse als Komplikation bei der Kavernensaugdrainage nach Monaldi, F. Strmen, Schweiz. med. Wchnschr., November 18, 1944, 74: 1197.*—(*H. Marcus*)

Air Embolism following Cavity Aspiration.—On theoretical grounds one might expect air embolism quite frequently as a complication of cavity aspiration in preparation for Monaldi drainage. Actually it is quite rare so that its occasional occurrence has not acted as a deterrent from a therapeutically sound procedure. To further minimize the chances for its occurrence, it is advisable to operate on a patient who is lying down. The patient has to be prevented from getting up at any time during the procedure and for one-half hour following it. Sufficient opiate should be given to prevent cough. A case is reported where the pa-

tient died shortly after the exploratory needle had been placed into the cavity. Autopsy showed that the needle had penetrated a small pulmonary vein. Bleeding into the cavity had occurred, and this had stimulated cough. The high pressure during cough had forced air from the cavity into the open blood vessel. The brain showed that the blood vessels of the pia-arachnoid and the base of the brain were filled with air bubbles.—*Über eine todlich verlaufende Luftembolie nach Kavernenpunktion, H. Mauderli, Schweiz. med. Wchnschr., November 18, 1944, 74: 1190.*—(*H. Marcus*)

Cavernostomy.—A big tuberculous cavity was opened with a galvanocautery. The walls and the bronchial openings were cauterized and the cauterizations were repeated eight times. Five months later there was no evidence of a pulmonary cavity except for a scar. It is believed that the indications for cavernostomy and cauterization of the cavity walls should be enlarged.—*La spéléotomie large dans le traitement des cavernes tuberculeuses du poumon, A. Bernou & R. Goyer, Rev. de la tuberc., 1943, No. 4/6, 8: 71.*—(*G. Simmons*)

Cavernostomy.—In 4 cases of large residual cavities persisting after thoracoplasty cavernostomy was performed. The cavity was opened widely. The walls and the draining bronchi were cauterized. In all 4 cases complete and persistent closure of the cavities was obtained. The necessity for a wide opening of the cavity and for a thorough cauterization is emphasized.—*Qualques exemples de spéléotomie pour cavernes résiduelles sous thoracoplastie, A. Bernou, R. Goyer & L. Marecaux, Rev. de la tuberc., 1944, No. 1/3, 9: 24.*—(*G. Simmons*)

Pulmonary Resection for Tuberculosis.—With the improvement of operative and anesthesia technique, resection in pulmonary tuberculosis has become a reasonable procedure. Although the immediate mortality has been greatly reduced, the late results are at present unknown. From scattered case reports it would appear that the patient may be in danger of fistula formation, reactivation and spread for years after the operation. There is still considerable controversy as to whether elective resection is a sound procedure. The majority of workers in the field feel that lobectomy should not be done if a cure by thoracoplasty appears likely. The procedure should be reserved for lower lobe cavities, located either near the mediastinum or in the middle portion of the lung. It would appear to be the ideal treatment for tuberculoma, but this condition is rarely diagnosed preoperatively. Its value in cases of bronchial disease is still disputed since persistent bronchial tuberculosis of the stump, with reactivation, is occasionally seen. The author reports on 9 cases, with one fatality. Three of the 8 surviving cases developed bronchial tuberculosis, but the overall result was satisfactory in all 8 patients. Only one upper lobe removal is among this series, and in this case thoracoplasty was refused by the patient and lobectomy was elected. The other 8 cases represent lower, or lower and middle lobe removals.—*Resection of the Lung in the Treatment of Pulmonary Tuberculosis, O. C. Brantigan, Arch. Surg., October, 1945, 51: 147.*—(*H. Marcus*)

Pulmonary Resection for Tuberculosis.—Tuberculous tracheobronchitis is known to present a serious prognosis and a complex therapeutic problem. Collapse procedures not only have limited value in cases of endobronchial tuberculosis, but actually may be dangerous. Because of the high incidence of atelectasis, unexpandable lung, empyema and anaerobic infection, pneumothorax and phrenic paralysis are contraindicated in the face of extensive bronchial ulceration or marked stenosis. Complete thoracoplasty has given by far the best results. However, analyses of reported series suggest that thoracoplasty has been applied to only a fraction of patients with tracheobronchial involvement. Many such cases progress so rapidly as never to be considered suitable candidates for thoracoplasty. The incidence of tension cavities, basal disease and wide-spread active disease is high in patients with bronchial involvement and associated stenosis. They do notably

poorly with thoracoplasty. Thirty pulmonary resections on cases complicated by endobronchial tuberculosis were performed by one of the authors between 1934 and January 1, 1944. Twelve of these were desperate cases operated on as a last resort; 96.6 per cent had positive sputum. The ratio of females to males was 4:1. The majority were in the fourth decade of life. Twenty-four of the 30 had stenotic bronchial lesions of which 11 were associated with ulceration. Five had ulcerative lesions. Only one had a submucosal type of tuberculous bronchitis, and this was associated with a 50 to 60 per cent narrowing of the right upper lobe orifice. Indications for pulmonary resection are: (*1*) associated suppurative disease; 4 such cases were included in this series; (*2*) post-thoracoplasty cases with uncontrolled disease; this series included 5; (*3*) extensive multilobar predominantly unilateral tuberculosis; there were 21 such cases in this series. An analysis of complications is based on whether or not the surgical procedure was done before or after January, 1942. This date was chosen because of the standardization in January, 1942 of operative procedure to the pleural flap method of bronchial closure and individual ligation. In this latter group no wound infection occurred, but one bronchial fistula, 2 empyemata, and 3 instances of postoperative contralateral spread occurred. There were 2 contralateral pleurisies with effusion in the entire series. One of these was positive by guinea pig inoculation. Routine postoperative bronchoscopy revealed ulceration of the bronchial stump in 4 patients, an incidence of 21 per cent. None of these patients had symptoms. Two were positive postoperatively, one by sputum examination, the other by gastric washings. Three of the 4 have been negative following bronchoscopy with application of 30 per cent silver nitrate. Operative mortality for the entire group was 26.6 per cent, or 8 out of 30. All but one of these deaths occurred in the desperate risk cases. Mortality in reasonable risk cases was 5.5 per cent. Three late deaths occurred, all in patients treated prior to January, 1942. This shifts the case mortality to 36.6 per cent. In the group operated on since January, 1942, one of the 12 reasonable risk cases died of postoperative embolism as contrasted with 4 out of 7 of the desperate risk cases (57.1 per cent). Only 4 deaths in the entire series were attributable to tuberculous infection. Five deaths were related to the surgical problems of pulmonary resection. Eleven out of the whole series of 30 have died. Of the remaining 19, 15 are clinically well, 11 have been discharged from the sanatoria to their homes. The other 4 are still on bed-rest. One has a mixed empyema and is awaiting thoracoplasty, one has ulceration of the bronchial stump, positive sputum, tuberculosis of the ilium and sacroiliac joint, and the other 2 have progressive contralateral lesions. They will eventually die of tuberculosis. Examination of pathological specimens reveals a much higher incidence of tuberculous bronchitis than that diagnosed bronchoscopically. Submucosal involvement with round cell infiltration and usually with tubercle formation is the earliest finding and has frequently been present when unsuspected. Ulceration or granulation merely represented the area where the bronchial disease had become an open focus. This is significant because of the possibility that in bronchial amputation the suture line will go through the involved portion of the bronchus. The draining bronchus of the cavity is involved almost without exception. This is especially notable in lower lobe cavities, most of which are located in the superior division of this lobe. Many of these lesions will not be discovered by bronchoscopy as they are "around the corner." When resection is contemplated in such cases the draining bronchus should be considered to be involved. A middle and lower lobectomy on the right side may be a more rational procedure with this type of lesion than a lower lobectomy because the bronchial suture line can be placed above the involved portion. Parenchymal lesions in the series have been characterized by a high incidence of basal disease with a tendency toward a bronchopneumonic type of tuberculous lesion. Examination of specimens leaves little doubt that, had collapse measures been used in these cases, a

large bulky mass of tuberculous lung would have been collapsed leaving a huge amount of diseased tissue as a threat in the future. Contralateral spread is still a definite threat having occurred in 15 per cent of this entire series and in 15.8 per cent of those with tuberculous bronchitis. At present an attempt is being made to overcome spilling at the time of operation by making bronchial ligation the primary step in resection. The use of intrabronchial anesthesia is anticipated to exteriorize each lung and thus possibly prevent intrabronchial spilling of secretions. Bronchial stump ulcers have occurred in 21 per cent of the series. In each instance endobronchitis had been present prior to resection. Ulcers occurred most frequently where mattress sutures were placed in the bronchus, so now only end sutures are used. The condition of the contralateral lung is of extreme importance though the presence of disease in it does not contraindicate resection. Many cases in this series had contralateral tuberculosis, but only 3 underwent exacerbation. The amount of lung tissue to be resected must be decided upon at the time of operation when the lung can be palpated. Not infrequently considerable unsuspected tuberculosis is found in a lobe necessitating pneumonectomy when only lobectomy had been contemplated. Where endobronchial tuberculosis involves the major bronchi, particularly where stenosis is present, pneumonectomy can be decided upon prior to exploration. On the right side in cases of basal tuberculosis, lobectomy is more feasible than on the left side because the intermediate bronchus is often free of disease. On the left side, lower lobectomy finds a limited field in cases with bronchial lesions and is applicable only rarely where bronchial lesions lie well below the level of the superior division. Case reports are given.—*Pulmonary Resection for Tuberculosis Complicated by Tuberculous Bronchitis (Preliminary Report), R. H. Overholt & N. J. Wilson, Dis. of Chest, January–February, 1945, 11: 72.*—(*K. R. Boucot*)

Primary Tuberculous Tracheobronchitis.—Sixteen cases of primary tuberculous tracheobronchitis were observed. There were no significant antecedents in the history of these patients, except in 2 cases, in which the onset of the endobronchial disease followed three to four years after erythema nodosum. Young females were more often affected than males. The symptoms of the initial ulcero-granulomatous phase were: nonproductive cough of a particularly violent and persistent character, retrosternal burning sensation, paroxysmal dyspnea and discrete hemoptysis. At later stages of the evolution when fibrostenotic changes prevailed, phenomena of bronchial obstruction, wheezing, atelectasis and suppuration in areas distal to the stenosis were observed. On bronchoscopic examination large productive lesions were noted, or in other cases an extensive necrotic caseous bronchitis was found. The sputum was mostly positive on direct examination with abundant acid-fast bacilli. The chest X-ray film showed no changes unless there was marked stenosis. In 6 cases there were no pulmonary lesions on the X-ray film; in 4 cases there was a slight retraction of one hemithorax; in 4 cases atelectasis was present and in 2 cases there was pulmonary suppuration. No tuberculous lung lesions were noted during the period of observation of these cases. The duration of the process of scarring varied from a few months to one and one-half years.—*Tracheobronchitis tuberculosas clinicamente primitivas o puras, J. C. Dighiero, Hoja tisiol, June, 1945, 5: 2.*—(*L. Molnar*)

Endobronchial Tuberculosis.—Direct signs of endobronchial tuberculosis are atelectasis, sudden consolidation of a lobe under collapse, sudden spread of an apparently controlled lesion, blocked cavity and far advanced disease. Indirect signs are hemoptysis of mild or streaking type without demonstrable X-ray findings, positive sputum without demonstrable cause or persistent nonproductive cough. Atelectasis may be massive with mediastinal shift or may consist only of small areas often found in apical regions. Blocked cavities and cavities which change in size suddenly may be due to endobronchial tuberculo-

sis either through ball-valve action or by stenosis or kinking of a bronchus. In one institution, 565 patients were bronchoscoped. Of these, 224 were examined routinely prior to thoracoplasty or other collapse procedure. The balance were bronchoscoped because of the above signs and findings. In the 224 cases bronchoscoped prior to collapse, 26 cases of ulceration or stenosis were found. Analyzing this group, of 61 cases with wheeze, 23 had positive bronchoscopic findings of ulceration or stenosis; of 81 with consolidation or atelectasis, 27 had positive findings; of 18 with new disease while the old disease was controlled, 5 had positive findings; of 28 cases without obvious source of hemoptysis, 8 had positive findings; of 50 cases with hilar flare, excessive dyspnea, etc., 17 cases of ulceration or stenosis were found.—*The Radiological Findings in Tracheo-Bronchial Tuberculosis, C. C. Birkelo & L. A. Poznak, Dis. of Chest, January–February, 1945, 11: 26.*—(*K. R. Boucot*)

Pathology of Tuberculous Tracheobronchitis.—The material consisted of 110 consecutive cases autopsied at Triborough Hospital for Tuberculosis with death due to tuberculosis. All had pulmonary involvement. Routine microscopic sections were taken from the anterior and posterior walls of the trachea, from the carina, and from both main bronchi as well as from any other grossly suspicious areas. The following lesions were seen: (*1*) diffuse reddening and edematous thickening of the mucosa (microscopically, these lesions revealed congestion with dense lymphocytic infiltration); (*2*) microscopic tubercles situated between glands or immediately beneath the epithelium; (*3*) shallow microscopic ulcerations of the mucosa with lymphocytic infiltration of the ulcer base (unless these revealed the presence of tubercle bacilli, they were not included in this series); (*4*) shallow microscopic ulcerations with tuberculous granulation tissue in the base; (*5*) gross ulcerations with tuberculous granulation tissue in the base, the most frequently encountered lesions (occasionally these ulcers had eroded cartilage); (*6*) ulceration with extensive tuberculous granulation tissue accompanied by fibrosis leading to some narrowing of the lumen (fibrosis was not marked in the trachea, was more appreciable in the main bronchi, but was only really advanced in degree in the branch bronchi); (*7*) diffuse fibrotic thickening of the bronchial wall accompanied by some narrowing and by the presence of superficial submucosal tubercles (this was also most marked in the branch bronchi); (*8*) scarring due to healing (none was seen in the trachea and only occasionally in the main bronchi; only in branches of the lobar bronchi draining tuberculous cavities was complete occlusion seen). The incidence of tuberculous tracheobronchitis was 60 per cent in this series without any noteworthy predisposition according to sex, race or age. There was a preponderance in cases with large pulmonary cavities, 70 per cent, as contrasted with 17 per cent in cases with small cavities. The author believes that primary tuberculous tracheobronchitis is extremely rare. Secondarily, it may be due to surface implantation, direct extension, to lymphogenous or hematogenous spread, but surface implantation seems to be the most common mode of infection. She suggests that, in bronchi draining cavities, the tuberculous process diminishes in severity as the main bronchi and trachea are approached. Fifty-seven per cent of the cases had tuberculous laryngitis. Of 54 cases having laryngitis, 13 had no tuberculosis of the trachea or main bronchi, while 18 without laryngeal involvement had tracheobronchial tuberculosis. Therefore, there is no apparent correlation between these two conditions. It is pointed out that autopsy studies have the disadvantage that cases with bronchial disease and minimal tuberculosis are not seen, while clinical investigation is limited to gross inspection and study of biopsy fragments. Therefore, close correlation is necessary between clinical observations and postmortem studies.—*Tuberculosis of the Trachea, Gertrude Silverman, Dis. of Chest, January–February, 1945, 11: 3.*—(*K. R. Boucot*)

Pathology of Endobronchial Tuberculosis.—Sixty lungs or lobes of lungs resected for tuber-

culosis by Dr. Richard H. Overholt and associates were examined. Microscopic study was made of all the main, lobar, and segmental bronchi. Tuberculous endobronchitis was found in 31, or roughly 50 per cent, of the series. Females in the third and fourth decades were particularly affected. All cases with endobronchial tuberculosis had positive sputum. One-third of the patients had had symptoms of tuberculosis for less than one year. All gradations of pathological changes were found between an occasional tubercle and stenosing tuberculous granulation tissue associated with fibrosis. Even with mildly extensive tuberculous involvement there was at times no ulceration or only focal or superficial ulceration. There was apparent continuity of disease from the point of endobronchial tuberculosis nearest the hilum through the segmental bronchi to the parenchymal lesion. Thus, whenever there was tuberculous bronchitis of a main stem bronchus, it was also found in a lobar bronchus. Severity of the disease varied considerably in different parts of the same bronchus. In 20 cases the parenchymal lesion from which the bronchial disease arose was a cavity. In the remainder it was a caseous focus of varying size and age. In 27 of the 31 cases it was possible to examine three or more of the hilar lymph nodes microscopically, and at least one node in each case was tuberculous. There was no instance of direct extension from a lymph node to a bronchus. It was concluded that tuberculosis of the larger bronchi is the result and complication of parenchymal tuberculosis. Observation of the frequency with which tuberculosis involved the hilar nodes proves lymphatic drainage of tubercle bacilli from the pulmonary focus to the hilum. Thus, the entire course of a bronchus, including segmental, lobar, and main stem, which leads from a parenchymal lesion is potentially subject to tuberculosis. The area nearest the pulmonary disease is obviously more subject to infection, accounting for the greater incidence of involvement of segmental bronchi. The bronchus has an ability to heal even when superficial ulceration has taken place. However, when tuberculous granulation tissue has replaced submucosa and mucosa resulting in stenosis, complete healing can only take place by scar tissue formation. Such an area of severe endobronchial tuberculosis may become independent of its apparent parenchymal lesion and act as a focus for further dissemination. Infection of a bronchus by direct implantation might be assumed because all in this series had a positive sputum were it not for the fact that bronchial disease *per se* may give rise to a positive sputum. Such implantation may occur but it was not possible to estimate its incidence from this study. Hematogenous dissemination did not produce bronchial disease in this study.—*Surgical Pathology of Endobronchial Tuberculosis, W. A. Meissner, Dis. of Chest, January–February, 1945, 11: 18.*—(*K. R. Boucot*)

Ulcerative Tracheobronchitis.—Bronchoscopic examinations were done in patients who had had previous episodes of atypical pneumonia followed by delayed convalescence, chronic bronchitis and hemoptyses. Ulcerative lesions of the tracheobronchial tree were found in 9 patients and were believed to be responsible for the protracted course of the disease. Biopsy of the ulcers revealed nonspecific granulation tissue and inflammation. These lesions are bronchoscopically indistinguishable from ulcerations due to Boeck's sarcoid, from the chronic infective granulomata or from the blastomycoses. The treatment consisted in bed-rest, high vitamin, high caloric diet, postural drainage, cauterization with silver nitrate and instillation of penicillin. The ulcerations healed within two to four months. Four cases are reported in detail.—*Ulcerative Tracheobronchitis following Atypical Pneumonia: Report of Cases, E. B. Kay, Arch. Int. Med., August, 1945, 76: 93.*—(*G. C. Leiner*)

Treatment of Bronchopleural Fistulae.—Atropine sulfate, ¼ mg. injected subcutaneously, was used repeatedly in the treatment of spontaneous pneumothorax occurring in the course of collapse therapy. In 6 cases there was apparently a favorable response, in 3 cases

no benefit was derived from this treatment. There are no contraindications to the use of atropine sulfate. Dyspnea is always relieved, probably because the bronchi become relaxed, the intrapulmonary ventilation improved and the lung follows the excursions of the thoracic cage better.—*Sulfate d'atropine et perforations pulmonaires, M. Dussert, Rev. de la tuberc., 1941, No. 5/6, 6: 339.—(G. Simmons)*

Pulmonary Hypoventilation Due to Tuberculous Lymph Nodes.—In tuberculosis of the tracheobronchial lymph nodes various effects on adjacent bronchi are distinguished. There may be development of a check-valve or stop-valve mechanism, both of which can lead to obstructive atelectasis. The first degree of bronchial obstruction is narrowing of the lumen with conservation of patency during inspiration and exspiration. It is believed that this state is not irrelevant for the lung sector supplied by the involved bronchus, but leads to a state of hypoventilation in this area. The following observations were made: the first sign was a definite diminution in the size of a lobe without any noticeable diminution in transparence. Since this phenomenon was transitory it was evident that it could not be due to fibrosis. It was best observed in the right upper lobe. Tuberculous changes in the tracheobronchial lymph nodes produced progressive diminution in the size of the right upper lobe with upward displacement of the interlobar fissure. In a certain percentage of cases the further course showed development of obstructive atelectasis with all the characteristic clinical and röntgenological signs. However, in the 29 cases with shrinkage of the right upper lobe, only 10 per cent developed obstructive atelectasis. The other cases showed only what the author calls lobar hypoventilation. The X-ray signs of this condition are: progressive upward displacement of the interlobar fissure, especially in its lateral parts, up to the level of the second rib or the first intercostal space; upward displacement of the upper pole of the hilum. No displacement of the organs of the mediastinum was noted. There was a slight diminution in transparence only with very marked contraction of the lobe. There was a lowering of the ribs as compared to the contralateral side. With regression of the specific inflammatory changes in the lymph nodes and reëstablishmerrt of normal bronchial patency all these changes were reversed. Thus, in 87 per cent a downward displacement of the interlobar fissure was observed. Only in cases with formation of pleural adhesions was the return to normal not noted. Hypoventilation of the other lobes were less clearly demonstrable. Hypoventilation of the whole lung has been observed mainly on the left side. There was a generalized diminution in transparence, a slight displacement of the heart to the affected side, upward displacement of the hilum and lowering of the ribs. In most cases of lobar hypoventilation the remaining lobes, and later on the contralateral lung, showed increased transparence, interpreted as transitory hyperventilatory emphysema.—*The Phenomenon of Pulmonary Hypoventilation in Tuberculosis of the Bronchial Lymph Nodes, A. K. Prozorov, Probl. tuberk., 1945, 1: 13.—(V. Leites)*

Laryngeal Tuberculosis.—Laryngeal tuberculosis often proves to be fatal not because of the anatomical lesion but because painful dysphagia leads to starvation and death. The vast majority of such lesions has its anatomical basis in vasomotor disturbances around a small chronic lesion. In such lesions infiltration of the stellate or of the thoracic ganglions with novocaine may prove beneficial, since the painful dysphagia may be eliminated and the nutritional state of the patient may subsequently be improved. This method was used in 16 cases since 1937 and favorable results are reported.—*Le traitement des laryngites tuberculeuses oedemateuses par l'infiltration novocainique des ganglions stellaire et thoraciques superieurs, H. Mollard, H. Maschas & M. Duret, Rev. de la tuberc., 1942, No. 6/8, 7: 193.—(G. Simmons)*

Pathology of Tuberculous Pleurisy.—Tuberculosis of the pleura is a local manifestation of a generalized dissemination, while tubercu-

lous pleurisy accompanies frequently the different phases of tuberculosis. The gross anatomical and histological features of the tuberculosis of the pleura are quite characteristic and are easily recognized as of tuberculous origin. In tuberculous pleurisy the inflammatory exudative process predominates; it is usually difficult to find definite evidence supporting its tuberculous origin. The presence of acid-fast bacilli in the pleural effusion, as well as careful histological study of numerous slides may reveal the definite tuberculous nature of the effusion. Tuberculosis of the pleura usually follows a pulmonary or lymphoglandular process or bone tuberculosis. The gross aspect of the lesions may be miliary or submiliary or coarsely nodular.—*Anatomia macro y microscopica de las pleuritis tuberculosas, A. L. Matteo, Hoja tisiol., March, 1945, 5: 99.*— (*L. Molnar*)

Serofibrinous Pleurisy in Tuberculosis.—Case histories of 2,163 and of 1,000 patients, of two services of a tuberculosis hospital, were reviewed with a view to study the relationship of pleural effusion to pulmonary tuberculosis. There were 29 cases in the first group and 40 cases in the second group of patients with pleurisy in their past history. In 8 cases of the former and in 4 cases of the latter the pulmonary involvement appeared simultaneously with the pleural effusion. In the great majority of the cases in both groups the clinical manifestations of the pulmonary tuberculosis appeared within two years after the pleurisy. The age of the patients was from 15 to 30 years in from 50 to 70 per cent of the cases. The revealing symptoms were hemoptysis and toxemic symptoms. The lung lesions following a pleurisy were of ulcerocaseous nature in 42 cases; of fibrotic character in 10; there were enlarged hilar shadows in 19, hematogenous nodular lesions in 8 cases. Extrapulmonary involvement was present, intestinal tuberculosis in 18 cases, laryngeal tuberculosis in 10 cases and single cases of different localization. —*La pleuresia serofibrinosa como primera manifestación de la tuberculosis del adulto, R. Cetrangolo, Hojo tisiol., June, 1945, 5: 2.*— (*L. Molnar*)

Hydrothorax.—Recurrent pleural effusions due to cardiac insufficiency may be extremely chronic. To relieve patients of dyspnea it may be necessary to remove large amounts of fluid at short intervals for months and years. Intravenous salyrgan fails to influence the hydrothorax even though it may otherwise produce good diuresis. When salyrgan is given into the pleural cavity directly, a greater and more prolonged diuretic effect is observed. This is due to the slower absorption of the drug from the pleural space, and due to the dilution of the agent with the effusion. In a case of a 71-year-old hypertensive cardiac, the problem of recurring hydrothorax was finally solved by the obliteration of the pleural space by quinine and urethane solution. Four injections of this solution resulted in a permanent symphysis of the pleural leaves. The patient was considerably improved following this procedure and the good result was maintained for some time.—*Hydrothorax récidivant, M. Roch, P. Alphonse & R. Roch, Schweiz. med. Wchsnschr., April 28, 1945, 75: 381.*—(*H. Marcus*)

Neuritis Secondary to Pleurisy.—Two cases are presented in which paralysis of one nerve in the homolateral arm had become manifest shortly after the onset of the pleural effusion. *N. cubitalis* and *N. circumflex*, respectively, were involved. The literature on the subject is reviewed and several theoretical possibilities are advanced to explain the nature of this complication, but no satisfactory explanation has been arrived at.—*Névrites des pléuritiques. (Paralysie cubitale droite contemporaine d'une pleurésie séro-fibrineuse droite. Paralysie du circonflexe droit au decours d'un epanchément pleural droit), S. Belbenoit, Rev. de la tuberc., 1941, No. 7/8, 6: 451.*—(*G. Simmons*)

Sodium Citrate in Treatment of Pleural Effusions.—Sodium citrate was injected intrapleurally in cases with pleural effusions in an attempt to prevent coagulation of the fluid and retard or prevent formation of pleural adhesions. Sodium citrate, 3.8 per cent, has proved to be efficacious; 5 cc. were injected every other day for two to three months in 44

patients with pneumothoraces of five to six years' standing. Small pleural effusions were present, but in 81 per cent of cases thus treated no pleural symphysis occurred. Of 25 cases of acute febrile pleural effusion recuperation without symphysis was obtained in 21 (84 per cent). The pneumothorax could be maintained and remained satisfactory. The following technique was used: during the acute febrile stage 5 cc. of sodium citrate were injected into the pleural space and the injection repeated a week later. After the acute stage of the pleurisy had passed, fluid was removed as often as it appeared to be indicated and at the conclusion of each aspiration more sodium citrate was injected. The aspirations were continued until the fluid formation had stopped. It is believed that such treatment cuts short the febrile period, decreases the total amount of fluid produced and prevents the formation of adhesions.—*Le citrate de soude moyen de lutte contre la symphyse pleurale, M. A. Dussert, Rev. de la tuberc., 1942, No. 3/5, 7: 155.*—(*G. Simmons*)

Pleurogastric Fistula.—In rare instances chronic empyemata penetrate through the pleural cavity and the diaphragm into the stomach. Only a few cases have been reported in the literature to which the author adds 2. Factors favoring this occurrence seem to be a poor tissue resistance which interferes with healing tendencies, and also a chronic infection of a tuberculous nature. Clinically the condition can be recognized by a sour smelling empyema drainage and by severe inanition. Barium given by mouth may pass readily into the pleural cavity only when the patient is turned into various positions. The seriousness of the condition requires that all chronic fistulae should be explored thoroughly by contrast media and their full extent established so that they may be drained surgically early and thus complications be avoided. The debilitated condition of the patient usually precludes more than palliative surgery so that the prognosis of pleurogastric fistula is almost uniformly bad.—*Pleurogastrische Fistel als Komplikation des Pleuraempyems, V. Kafka, Schweiz. med. Wchnschr., June 9, 1945, 75: 520.*—(*H. Marcus*)

Tuberculous Pericarditis.—The electrocardiographic changes in pericarditis are probably due to subepicardial myocarditis rather than the result of fluid accumulation in the pericardial sac. To substantiate this view, the author demonstrates tracings in a proved case of tuberculous pericarditis before aspiration, after aspiration and following air replacement, and several hours later following air absorption. The abnormalities consisted of an elevated arch shaped ST segment, most pronounced in lead II, and this change was present in all three tracings. Death occurred five days later from hemoptysis. Autopsy showed the presence of subepicardial myocardial involvement.—*Electrocardiographic Studies in a Case of Serous Tuberculous Pericarditis, in the Initial Stage, L. E. Warfvinge, Acta med. Scandinav., December 22, 1944, 119: 461.*—(*H. Marcus*)

Nasal Tuberculosis.—A 25 year old female started in good health to have an acute coryza which was followed after five days by complete aphonia. Bilateral tuberculous lesions were found and bilateral pneumothorax was established, whereupon the aphonia disappeared. Two years later the patient had an epistaxis which was followed by painful swelling of the nose. Cauterization did not help and the dorsum of the nose started sinking in. A biopsy was done and a sessile tumor was found which had perforated the nasal cartilages and the septum and corroded the bone. The histological findings showed a vascularized tumor with infiltration of polynuclear and giant cells surrounded by epithelioid cells and lymphocytes. Small foci of necrosis were found. No tubercle bacilli could be seen in any of the slides. The diagnosis was tuberculoma. These tuberculomata are very rare, not more than 2 per cent of all tumors of the nose. They are more frequent in women than in men (4:1), most frequent in the age group of 20 to 40 years. The implantation in the nasal region results from traumatism, gen-

erally made by the finger. They have the tendency to invade and destroy the surrounding tissue. The first symptom is a unilateral progressive nasal obstruction with typical neuralgic pain, generally accompanied by epistaxis. The evolution is slow. The differential diagnosis has to consider malignancy, especially sarcoma, also papilloma, adenoma, epithelioma, and polyp.—*Tuberculosis nasal, forma seudopapilomatosa del tuberculoma, J. A. Sciuto, J. C. & H. C. Alonso, Rev. de tuberc. d. Uruguay. 1944, 12: 253.*—(*W. Swienty*)

Osteo-articular Tuberculosis in Childhood.—The incidence of osteo-articular tuberculosis in children is high in Lima, Peru: in two years 156 cases were diagnosed on the Orthopedic Service of that city. In 53.59 per cent of these cases there was involvement of the spine, in 26.92 per cent of the knee, in 23.78 per cent of the hip, in 3.86 per cent there was osteoarthritis of the foot; besides one case of each: hand, elbow and sacrum, was observed. The age of the patients ranged from one year to 13 years. The largest incidence was shown by the age group from 5 to 10 years (46.25 per cent), followed by the age group from 2 to 5 years (32.69 per cent); 63.46 per cent of the patients were males and 36.54 per cent were females. No apparent reason could be invoked to explain the higher incidence of the disease in males. It is significant that more than half of the patients attended the clinic for the first time more than six months after the onset of clinical symptoms. Local traumatism was almost always present in the history of the patients. The presence of abscess, discharging sinuses, luxations and subluxations complicated the picture in 42.95 per cent of the cases. Owing to deficiency in equipment and to lack of funds, only one part of the cases were studied by X-ray: in 62 cases where chest X-ray was taken there were lung infiltrations in 70.92 per cent and enlarged hilar shadows in 11.29 per cent. Only 20 children could be hospitalized, while the remainder of the children received only ambulatory treatment. The above data reveal the severe deficiency in the care of these patients that calls for urgent measures to facilitate the early diagnosis and the proper treatment in specialized hospitals.—*La tuberculosis osteo-articular en la infancia, R. Tijera, Rev. méd. peruana, March, 1945, 18: 195.*—(*L. Molnar*)

Ileocecal Tuberculosis.—Ileocecal tuberculosis requires X-ray confirmation. The finding of inflammatory lesions in the ileocecal region in a tuberculous patient is good presumptive evidence. The X-ray task, therefore, is to determine whether organic inflammatory disease is present. In a tuberculosis hospital the problem is a little simpler than in the random case of a general hospital. There is a wide variation in the clinical signs and symptoms; indeed, a patient may have extensive disease with few or no gastro-intestinal symptoms. However, X-ray findings are sufficiently constant to indicate the real diagnosis. Pain is usually greatest in the right lower quadrant and generally is accompanied by tenderness about McBurney's point. Occasionally tumefaction is present, and attacks may suggest transient volvulus or acute appendicitis. Diarrhea may be present with or without positive stool cultures. Direct roentgenological evidence is looked for in the terminal ileum, ileocecal valve or cecum, while indirect evidence is given by the remainder of the ileum, appendix and colon. The psoas shadow is also of importance. An enlarged spleen or liver due to amyloid can be seen on abdominal X-ray films. The examination includes hourly studies of the small intestine until the ileocecal region is clearly visualized. Barium enema studies are also made. Here the postevacuation films may be the most informative. The terminal centimeters of the ileum are the most frequently involved. Simple transient spasm may characterize early disease, and there may also be a slight mucosal irregularity. In later disease loss of mucosal markings may be accompanied by narrowing of the terminal ileum which often is associated with irregularity of the walls, straightening and rigidity of the walls and a cone-shaped terminal ileum, or a string-like appearance of the ileum. Loss of normal changes in ap-

pearance on serial exposures and possibly an ulcer crater may also be noted. In the region of the ileocecal valve the most common X-ray findings are increased visibility of the valve, a gaping of the valve with no evidence of obstruction, delay or obstruction at the valve and regurgitation of medium when the barium enema is evacuated. The appearance in the region of the cecum also depends upon the duration and severity of the lesion. Here one may observe mucosal irregularities, spasm and deformity of the usual cecal shape, stiffening in contour of the cecum, Stierlin's sign and a negative shadow caused by the ileocecal valve. Indirect roentgenological signs include irregularity in contour, evidence of ulcer or fixation of the appendiceal outline, a segmented and fragmented appearance of the colon and ileum, obliteration or poor visualization of the psoas shadow, evidence of an enlarged liver and spleen and disturbances in intestinal mobility. —*Ileocecal Tuberculosis, M. R. Camiel, Radiology, April, 1945, 44: 344.*—*(G. F. Mitchell)*

X-ray Studies in Intestinal Tuberculosis.—Tuberculous lesions of the intestine are classified as primary and secondary. The primary form is characterized by hyperplasia and involves in 76 per cent the cecum and the ascending colon. The secondary form can be either purely ulcero-exudative or hyperplastic. Serial X-ray films show that 30 per cent of all lesions are found in the terminal ileum, in the region of the ileocecal valve or in the first portion of the ascending colon. There may be nontuberculous inflammatory processes in the rest of the colon. The lesions are found in Peyer's patches. In some cases they heal by calcification. The rapidity with which the opaque material passes through the small bowel depends on the secondary irritation of the nerve endings and on the hyperdistension of the intestinal lumen. There may be incomplete obstruction and modifications in the calibre of the loops with hypermotility or, in the more chronic forms, sensation of peristalsis. The most important sign is gas formation. Alternating zones of distension with almost filiform obstructions may be found. In the large intestine there is hyperperistalsis in the ulcerative and distension in the sclerotic forms. The colon may lose completely its mucous and muscular pattern and be seen as a rigid tube. In the hyperplastic form the lumen of the colon may be partially obstructed and the X-ray picture may be that of a tumor. The localized form of secondary intestinal tuberculosis is most frequent (80 to 90 per cent) in the region of the ileocecal valve. There may be generalized or solitary ulcerations. The ileocecal valve is rigid. The rest of the colon may be intact or may show changes due to irritation. Fibrotic changes are generally late consequences, secondary to pulmonary tuberculosis. The diagnosis of tuberculous appendicitis can only be made by anatomico-pathological studies. The differential diagnosis of intestinal tuberculosis has to take into consideration: intestinal obstruction, amebic or ulcerous colitis, tumors, especially carcinoma, acute enteritis, ileitis, appendicitis, abscess, syphilitic lesions. A final diagnosis cannot be made by X-ray examinations alone, without pathological studies and laboratory tests.—*Radiologia de la tuberculosis enterocolo-peritoneal, A. P. Heudtlass, P. A. Crocchi & J. A. Marti, Prensa méd. argent., July 6, 1945, 32: 1261.*—*(W. Swienty)*

Genital Tuberculosis.—A chronic ulceration of the vulva may be due to syphilis, leprosy, a neoplasm or tuberculosis, and the diagnosis can be made only by biopsy. However, if biopsy reveals giant cells or epithelioid cells only and no bacilli, animal inoculation is necessary. In the case presented the 33 year old woman had had a pleurisy ten years prior to the onset of the genital ulcer. The ulcer was found on the internal surface of the right *labium minus*. It was irregular with an ill-defined border. It was covered with a whitish membrane and presented granulations which bled easily. There was a small fistular tract extending toward the perineum. The patient had been under medical treatment for seven years. The lesion was removed with a thermocautery. Microscopic examination revealed the presence

of giant and epithelioid cells. Guinea pig inoculation was not done.—*Chronisches Vulvageschwür tuberkulösen Ursprungs, Z. E. Navratil, Zentralbl. f. Gynäk., 1941, No. 19, 65: 884.*—(*G. Simmons*)

Tuberculous Tonsils and Cervical Lymph Nodes.—From time to time reports have appeared to the effect that tonsillectomy had a favorable influence on the course of tuberculous lymphadenitis of the neck. It was felt that convalescence from the disease was more rapid and recurrences less common after tonsillectomy. On the basis of 47 cases observed in a children's sanatorium, the author concludes that recurrences and breakdown of cervical lymph nodes are just as frequent after tonsillectomy as before. If the removed tonsils were not tuberculous on histological examination, however, nonspecific lymphadenitis was less likely to recur. Of the 47 cases observed, tuberculous tonsils were found in 34 cases. The remainder of the patients showed nonspecific inflammatory changes in conjunction with tuberculous cervical lymph nodes. It is questionable whether the tuberculous tonsil and the tuberculous cervical lymph nodes constitute a primary tuberculous complex.—*Tonsillektomie und tuberkulöse Halslymphome, H. Wissler, Schwiez. med. Wchnschr., October 20, 1945, 75: 927.*—(*H. Marcus*)

Skin Tuberculosis.—Thirty cases of skin tuberculosis and related conditions were investigated as to the presence of tubercle bacilli in the lesions. Crushed biopsy material was injected subcutaneously in guinea pigs and simultaneously grown on specific media. The culture media employed were those of Löwenstein and Laporte (serum, egg-yolk, 5 per cent glycerine). Intracutaneous tuberculin tests were performed in all inoculated guinea pigs, starting three weeks after inoculation, and repeated at regular intervals if negative. The animals were killed after four to six weeks. The type and virulence of the isolated bacilli were determined as follows: (*1*) intravenous inoculation of rabbits with a dose of 0.01 mg., (*2*) intracerebral inoculation of rabbits with a dose of 0.05 mg., (*3*) subcutaneous inoculation of guinea pigs with 0.01 mg. The intracerebral inoculation proved to be more effective than the intravenous in differentiation of bovine and human types. The virulence was evaluated according to the extent of lesions produced with a dose of 0.01 mg. in the guinea pig two months after inoculation. Virulent bacilli produced after this period of time serious disease in guinea pigs with extensive lesions in all organs. After inoculation with bacilli of low virulence the animals remained in good condition and presented only minimal lesions on autopsy. Among the 30 cases of this study 17 belonged to the group of tuberculosis of the skin: 5 cases of *tuberculosis verrucosa*, 6 cases of lupus, one case of tuberculous ulcer, 3 cases of ulcerated tuberculoma, 2 cases of inoculation with tuberculosis from without (one case of primary infection and one case of reinfection). In 16 out of these 17 cases tubercle bacilli could be demonstrated with the above described methods. Six other cases were considered belonging to the group of tuberculids, ("acnitis" of Barthelemy, ulcerated tuberculid, *erythema induratum*, Boeck's sarcoid). Only one positive inoculation result was found in this group; an attenuated human strain was isolated from the case of *erythema induratum*. All other cases of this group were found negative. The last 7 cases included skin lesions, the tuberculous nature of which is still unsettled (*granuloma annulare, lupus erythematosus*, acne). Only one positive inoculation was found in a case of *acne conglobata*, consisting of an attenuated human strain. The 6 other cases were negative. A total of 18 strains of tubercle bacilli were isolated; 15 were of the human type, 3 of the bovine type. Two bovine strains were of normal virulence, the third was slightly attenuated. Among the human strains 7 had normal and 6 attenuated virulence. No correlation was found between the age of the lesion and low virulence of the bacilli. However, the quantity of bacilli was greater in more recent lesions. Histological examinations were performed of all above enumerated lesions. The typical histological

pattern of tuberculosis was found in all cases of *tuberculosis verrucosa*, in 5 cases of lupus, in one case of tuberculous ulcer, and in one case of ulcerated tuberculoma. All these cases were confirmed as tuberculous by bacteriological examination. In 3 cases the bacilli could be directly demonstrated on the slides. It is believed that in some cases the histological aspect of a skin lesion is sufficiently typical to permit a diagnosis of tuberculosis even if tubercle bacilli are not demonstrable with the available methods.—*Le controle histo-bactériologique des tuberculoses cutanées, F. Bloch & M. Ducourtioux, Ann. Inst. Pasteur, August, 1940, 65: 67.*—(*V. Leites*)

Pharmacological Action on Bronchi and Intrapleural Pressure.—Drugs acting on the bronchial musculature were investigated regarding their effect on pulmonary volume and intrapleural pressures. The following substances were studied: adrenaline, ephedrine, atropine, acetylcholine, pilocarpine, eserine, yohimbine, ergotamine, histamine and substances of the nicotine group. These drugs were administrated to dogs in various doses intravenously, intrapleurally or subcutaneously. The animals were under chloral narcosis. The respiration was registered with a pneumograph, the intrapleural pressure was measured with a water-manometer. It was found that bronchodilating agents produced an increase in pulmonary volume with a concomitant fall in intrapleural pressure (in the sense of an increase in negativity). Bronchoconstricting agents had the opposite effect. The intensity of the action on pulmonary volume and intrapleural pressure varied with the dose of the drug. Small doses did not modify the pneumogram, a fact which is interpreted as absence of effect on the respiratory centre. The variations in volume and intrapleural pressure are considered due to action on vascular and bronchial musculature in the lung. With large doses the action was not limited to the lung, but affected also the respiratory centre, as evidenced by changes in amplitude, frequency, and sometimes even rhythm of respiration. Another mechanism of the action on intrapleural pressure was considered (reference is here made to the studies of Brill, Prinzmetall, and Leake in U. S. A. on a similar subject): bronchoconstriction produces a resistance to the passage of air from and to the alveoli. This in its turn is thought to increase the carbon dioxide tension in the alveoli and in the blood. The result is stimulation of the respiratory centre with increase of inspiratory movements leading to the development of a more negative intrapleural pressure. Inversely, bronchodilating agents produce higher intrapleural pressures through relative depression of the respiratory centre and diminution of inspiratory activity.—*Mécanisme d'action des drogues bronchomotrices sur la pression intrapleurale, J. Troisier, M. Bariéty & D. Kohler, Rev. de la tuberc., 1939–40, 5: No. 13, 1473.*—(*V. Leites*)

Respiratory Variations and Arterial Pressure.—The authors have studied the influence of the respiratory variations on the arterial pressure in both the pulmonary and systemic blood circulations. Adult cats were studied with open thorax, with closed thorax and without opening the thorax but exposing the heart. The manometric readings were taken in the intrapericardial portion of the pulmonary artery, in the arch of the aorta and in the abdominal aorta. The changes in the arterial pressure in the systemic and pulmonary circuit depend on the type of respiration. There are fundamental differences between normal and artificial breathing. With normal breathing the pressure falls during inspiration in both circuits. It is delayed for two or three beats in the systemic circulation. The lowering of the intrathoracic pressure in inspiration increases the capacity of the vascular bed of the pulmonary vessels. The lowering of the pressure in the pulmonary arteries causes a diminished blood flow to the left ventricle which in return with some delay causes an inspiratory fall of the pressure in the systemic circulation. With artificial respiration the problem is different. In the authors' experiences, the pulmonary pressure rises both

in systole and diastole, and the systemic pressure falls during inflation especially when it comes to a state of filling which is nearest to normal respiration. This is due to an increase of the resistance in the pulmonary circulation. In addition, in artificial rspiration with high hyperpressure the flow of the blood to both ventricles is impeded. This causes a fall of the systemic pressure and a reduced pulse pressure in both circulations. The difference was 6 mm. in the pulmonary circuit when the artificial hyperpressure was 30 mm. Hg. With equal intratracheal pressures a greater decrease of the pressure is obtained with closed thorax than with open thorax. The compression of the heart and of the great vessels by the intrathoracic pressure in closed thorax is responsible for this difference. The difference is small because the diastolic pressure in the pulmonary artery cannot be less than the intrapulmonary pressure. In moderate artificial respiration the fall of the pressure in the aorta is due to the difficulty of the circulation in the pulmonary bed. In hyperpressure the similarity in both circulations indicates the difficulty in the afflux of the blood to both ventricles.—*Mecanismo de las variaciones respiratorias de la presion arterial en ambos circuitos, A. Lanari, V. A. Alberti & R. Gonzalez S., An. Càted. de pat. y clin. tuberc., June 1, 1944, 5: 28.*—(*W. Swienty*)

Influence of Sex Hormones on Pulmonary Tuberculosis.—Administration of folliculine eliminates menstrual flair-ups only in a certain percentage of cases, those with hyposecretion of folliculine. In cases with hypersecretion the administration of progesterone and especially testosterone gave excellent results by influencing favorably menstrual and premenstrual disturbances: congestion of the breasts, uterine pain, premenstrual hemoptyses, chest pain, febrile episodes and exudative extension of the lung lesions. On the other hand, in some cases testosterone has produced hemoptyses and congestive flair-ups, which subsequently could be influenced by folliculine. It is therefore assumed that two modifications of the soil are unfavorable for tuberculosis: hypersecretion and hyposecretion of folliculine. The following observation also corroborates this opinion: some patients have been at first improved by the administration of a hormone and then made worse by prolonging the treatment. The administration of the antagonistic hormone, which had been ineffective at first, was at this time very useful, at least for a short period.—*Une démonstration expérimentale de l'action du terrain sur l'évolution de la tuberculose pulmonaire, H. Mollard & M. Duret, Rev. de la tuberc., January–February, 1941, 6: 41.*—(*V. Leiles*)

Significance of Tuberculin Allergy.—The variations of tuberculin allergy can be studied by following the same individual for a long period of time or by determining tuberculin sensitivity with quantitative precision in a great number of individuals of all age groups. The latter method was chosen for this study. The intracutaneous tuberculin test was performed on 941 subjects between the ages of 15 and 96, all free of clinical tuberculosis. Dilutions of 1:1000 and 1:100 were used. The following findings were noted: there was a progressive increase in the intensity of tuberculin reactions until the age of 30 or 40, a persistence at this level for a long period of time and a decrease in intensity during old age. The intensity of tuberculin reactions was evaluated under two aspects: first, according to the percentage of cases reacting to dilutions of 1:1000 (or 1:10,000) as compared to those reacting to 1:100; second, according to the percentage of strong, moderate or slight reactions with the weakest solution used. The intensification of the tuberculin reaction with advancing age cannot be explanied in connection with primary infection. It is true that tuberculin allergy consecutive to primary infection increases in intensity for a certain time, but this time is short and usually does not exceed six to eight weeks, the maximum period being five months. Thus, tuberculin allergy due to primary infection reaches its height early. If the above findings indicate progressive intensification throughout the years, there must be a factor responsible which

counteracts the natural decline of allergy. This factor is considered to be the occurrence of exogenous reinfections. The influence of age intervenes also, in the sense that the general tendency to sensitizations increases as compared to childhood. Nonspecific sensitizations may furthermore stimulate tuberculin reactivity. The decline of tuberculin allergy during old age is considered due to diminished activity and more retired way of life, implying a constant decrease of chances of exogenous reinfection. A support for this view is seen in the fact that in experimental tuberculosis in animals no intensification of the tuberculin reaction is noted. This is attributed to the lack of exogenous reinfections under laboratory conditions. A further argument in favor of the above expressed theory is seen in the statistics of Opie and McPhedran, demonstrating higher intensity of tuberculin reactions in groups of individuals exposed to tuberculosis as compared to nonexposed groups.—*Données nouvelles sur l'évolution et la signification de l'allergie tuberculinique. Premier memoire: les grandes tendances évolutives de l'allergie tuberculinique chez les sujets non-tuberculeux. Allergie et reinfection, G. Canetti & H. Lacaze, Ann. Inst. Pasteur, December, 1940, 65: 485.*—(*V. Leites*)

Hypersensitivity and Immunity.—The immunizing effect of R_1 strain tubercle bacilli was studied under various aspects. In the first series of experiments vaccination was performed by subcutaneous administration. (*1*) Guinea pigs were infected with R_1 strain bacilli in one to three doses of 1 to 1.5 mg. Six weeks later the animals were inoculated subcutaneously with small doses of moderately virulent bovine bacilli. With the exception of 2 animals, which presented rather numerous visceral lesions, all other animals had only inguinal and lumbar adenopathies and some tubercles in the spleen. All controls presented massive parenchymatous lesions. (*2*) Similar results were obtained with inoculation of moderately virulent human bacilli. (*3*) Intraperitoneal injection of moderately virulent human bacilli was performed six weeks after vaccination with 2 mg. of R_1 strain. Up to the fourth month after inoculation the animals showed granulations of the epiploon and lumbar and mesenteric adenopathies. Animals killed after the seventh month showed lesions in spleen, liver and lungs. The controls died with far advanced lesions within three to nine weeks after the virulent infection. (*4*) Inoculation of bovine bacilli of *high* virulence consecutive to vaccination with R_1 resulted in death of 2 guinea pigs with caseous inguinal and lumbar adenopathies. The 4 other infected animals died fifteen weeks after inoculation with extensive visceral lesions. The controls died of generalized tuberculosis within eight to ten weeks. (*5*) Intraperitoneal infection with a very virulent bovine strain resulted in death with massive lesions in the organs nine to eighteen weeks later. Controls died within eleven to fourteen weeks. (*6*) Intracutaneous inoculation with a moderately virulent bovine bacillus produced twenty-four hours later a nodule, which subsequently went on to enlargement, central necrosis and ulceration within the next two months, after which time regression and scar formation were noted. The animals died or were killed between the fourth and seventh month. Massive adenopathies and some disseminated tubercles were found in the spleen and in the lungs. Controls developed the nodule at the site of inoculation only after twelve days. There also was subsequent enlargement and ulceration of the nodule, but no regression took place until the death of the animal. (*7*) Intracutaneous infection with very virulent bacilli after previous vaccination also resulted in an accelerated reaction. Fifty per cent of the animals died after eighteen to twenty-six weeks. Controls died after nine to thirteen weeks. Further experiments were performed in varying the route of the vaccinating injection. It was found that intravenous and intracutaneous vaccination gave the best immunizing results. Studies were made to determine the minimum time between vaccination with R_1 strain and the first appearance of resistance against virulent infection. It was found that the immunity became manifest

between the fourteenth and the twenty-fifth day, remaining stationary up to the fifty-sixth day. It is concluded from all above experiments that vaccination with R_1 strain could in no instance confer a complete immunity to superinfections and had in the best case a retarding effect on the appearance and progression of lesions. The second part of the paper deals with the relation between tuberculin allergy and immunity. Guinea pigs were vaccinated with R_1 bacilli and subsequently desensitized with repeated injections of tuberculin. Intracutaneous injection of virulent bovine bacilli was then performed. Two out of the fourteen guinea pigs presented no local reaction twenty-four hours after inoculation, whereas all vaccinated but not desensitized animals showed a local reaction twenty-four hours later. The vaccinated and desensitized guinea pigs began to show local reactions from the fifth day on, which had the typical characteristics of tubercles on the thirteenth day. In nonvaccinated controls the local reaction appeared on the ninth day. In the two groups of vaccinated animals (desensitized and nondesensitized) the further development of the infection was identical. It was retarded as compared to controls and finally led to death of generalized tuberculosis.—*L'hypersensibilité à la tuberculine et la résistance aux surinfections virulentes produites par le bacille tuberculeux atténué R_1, A. Boquet, Ann. Inst. Pasteur, January, 1941, 66: 32.*—(*V. Leites*)

Sympathetic Nerves and Tuberculin Reaction.—Preliminary experimental data favor the conception that tuberculin skin reactions are secondary to an altered sensitivity of the neurovegetative system. Novocaine infiltration of the cervico-thoracic sympathetic system decreases the tuberculin response in the homolateral arm both as to size and redness of the reaction. Subsequent injections of novocaine prolong and reinforce this decrease of the tuberculin response; never, however, does the tuberculin test turn entirely negative. Injection of a stellate ganglion only is without effect, probably because not all the sympathetic nerve fibres of the upper extremity pass through it. Some may reach the first thoracic ganglion directly.—*Influence des infiltrations du sympathique sur les intradermo rèaction a la tuberculine, G. Guiot & J. D. Ghali, Rev. de la tuberc., 1941, No. 5/6, 6: 521.*—(*G. Simmons*)

Nature of Tuberculin.—The antigen-antibody reaction occurs not only *in vivo*, but also *in vitro*, and may be manifest by precipitation in test tubes. This enables more accurate studies to be made. The toxic reaction to Old Tuberculin in the tuberculous patient is an allergic phenomenon. The potency of Old Tuberculin is measured by ability to kill guinea pigs; due to a dialysable polysaccharide, or by skin reaction. This latter is caused by a nondialysable substance, which may be precipitated by ammonium sulfate or trichloracetic acid. The protein precipitated by the former chemical has a molecular weight of 32,000, whereas the latter has one of 16,000 and is nonantigenic. This pure protein derivative may be obtained from culture filtrates with much care and avoidance of heat. A union of the protein with a colloidal substance prevents antigenicity, but the ability to cause a skin reaction is retained. For standardization a tuberculin unit was defined as the active substance in 1/100,000 cc. of Old Tuberculin. In guinea pigs the sensitivity to tuberculin was directly proportional to the duration of infection with tuberculosis. Such a relation has not been shown in humans.—*Ueber Reindarstellung, Wirkungsmechanismus und Wertbemessung von Tuberkulin, R. Prigge, Schweiz. med. Wchnschr., January 20, 1945, 75: 63.*—(*J. Gerstein*)